ing and they were easily recognized on the wing. Bartsch, stimulated by Reiff's interest, went again to the same meadow in 1910 and caught another damaged one, almost exactly like the other three. Reiff gives a figure of the upper and under surfaces of the first and a diagram of the neuration of one side. In all respects there is a close resemblance to the *Argynnis aglaia* taken near Eastbourne.

The capture of three specimens in one year and its recurrence three years later in the same isolated meadow is strong evidence that the abnormality is inherited, especially in view of the fact that these are the only specimens recorded in *cybele*. The two S.E. London *grossulariata*, almost certainly members of the same brood, add further evidence of its inheritance.

I am able to add one more species, in which the defect has occurred. There is a very perfect example in *Plebejus argus*, L., male, in the collection of Mr S. G. Castle Russell.

The nature of the defect is uncertain. During an early stage of development tracheal branches enter the wing-buds and extend as they enlarge. At a later stage the longitudinal nervures are formed around the tracheae, and during the final stages the hypodermis secretes the thickened cuticular walls of the nervures. It is at this stage that the peroneural defect becomes apparent. The tracheae grow as usual, but the hypodermal cells fail to form the cuticular tube along the whole of their length. The proximal parts are formed normally and isolated pieces of the more distal parts; the faint lines, which disappear on transillumination, are probably the tracheae themselves.

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LIGHT-TRAP CAPTURES IN IRELAND IN 1945 (LEP., TRICH., EPHEM., PLEC.).

By Bryan P. Beirne and J. R. Harris.

Owing to electricity rationing it was not possible to operate light traps in Ireland during the war. In 1945, however, two traps were in use in Co. Dublin, one in the wooded valley of the Liffey at Lucan and the other on the cliffs of Howth. The authors wish to express their thanks to Mr George Shackleton, jun., and to Professor J. Bayley Butler for providing the electricity for these traps and for their assistance in operating them.

The Lucan trap was that in which some 310 species of Lepidoptera were taken at Seapoint, Co. Dublin, in the four years before the war (see Beirne, *Ent. Rec.*, **53**: 45) with one modification in that instead of three sheets of glass in the front there were only two, which were so arranged as to leave a vertical opening about two inches wide between their inner edges through which the insects could enter. Illumination was provided by a 60-watt bulb, which was lit for six days and nights a week. For reasons which will become apparent, it is necessary to

describe the location of this trap in some detail. It was situated on a cement landing-stage on the banks of the Liffey, its floor being only a few inches above the surface of the water. The presence of a weir keeps the river at more or less the same level at this point. The trap was situated on a bend of the river, facing upstream over the water. Behind it was a wall, above which was a gravel path, a large house, and a mill. Because of the position of the trap any insects attracted to it had to fly some distance over the surface of the river from either bank.

This trap was in use from the beginning of May to 20th September. The Lepidoptera taken were identified and their numbers noted, and the Trichoptera, Ephemeroptera and Plecoptera were identified, but were not counted owing to the vast numbers of certain species. Diptera were attracted in enormous quantities, and their dead bodies, and those of the Trichoptera, often formed a layer on the floor of the trap several inches deep in the corners. The Diptera were not identified.

Lepidoptera (B.P.B.). A total of 197 specimens were taken, belonging to 64 species. Only 31 specimens, comprising 15 species, were taken during May, namely: *Laothoë populi* (1), *Dasychira pudibunda* (2), *Spilosoma lubricipeda* (10), *S. lutea* (3), *Cycnia mendica* (1), *Calocasia coryli* (4), *Electrophaes corylata* (1), *Dysstroma truncata* (1), *Lampropteryx suffumata* (1), *Xanthorhoë ferrugata* (1), *Epirrhoë alternata* (1), *Hydriomena coerulata* (1), *Eupithecia* sp. (2), *Gonodontis bidentata* (1) and *Phlyctaenia fuscalis* (1). The only captures during June were *S. lubricipeda* (6) and *Nymphula stagnata* (1), while in July no Lepidoptera were taken. Late in July the trap was turned at right angles to face one bank of the river, but this made no difference. This slackening-off in the captures was remarkable, especially when dozens of specimens, and not infrequently over a hundred, were taken in the same trap every night at Seapoint which, being in the suburbs of Dublin, should be a much less favourable locality than Lucan.

The only likely explanation which could be suggested was that the effect of the river was to create a relatively cold belt of air over its surface. As Lepidoptera are very sensitive to temperature changes, this cold air might have prevented them from reaching the trap. In May the contrast between the temperature of the air over the river and that over the banks was less marked than later in the summer, and thus would not have had so great an effect on the Lepidoptera and allowed a few specimens to reach the trap.

In order to test this theory the trap was raised on a platform about ten feet vertically above its original position on 10th August. The results provided a strong indication that the theory may be correct. Between that date and 10th September 166 specimens, belonging to 51 species, were taken. They were as follows: *Cilix glaucata* (2), *Cryphia perla* (2), *Amathes xanthographa* (1), *Diarsia rubi* (1), *Triphaena pronuba* (2), *T. ianthina* (1), *Tholera popularis* (15), *T. cespitis* (1), *Luperina testacea* (2), *Phlogophora meticulosa* (5), *Phalaena typica* (4), *Apamea monoglypha* (2), *A. secalis* (2), *Hydraecia oculea* (5), *H. micacea* (6), *Gortyna flavago* (8), *Arenostola pygmina* (12), *Leucania pallens* (2), *L. lithargyria* (1), *Amphipyra tragopogonis* (4), *Agrochola lota* (1),

Cirrhia icteritia (1), *Plusia chrysitis* (1), *P. festucae* (1), *P. gamma* (3), *Hypena proboscidalis* (1), *Sterrha dimidiata* (1), *Ortholitha chenopodiata* (6), *Dysstroma truncata* (12), *Lyncometra ocellata* (2), *Thera obeliscata* (1), *Xanthorhoë designata* (1), *X. fluctuata* (1), *Epirrhoë alternata* (6), *Gymnoscelis pumilata* (1), *Orthonama lignata* (1), *Ennomos quercinaria* (1), *Deuteronomos alniaria* (1), *Alcis rhomboidaria* (1), *Cleorodes lichenaria* (1), *Crambus tristellus* (27), *Nymphula stagnata* (3), *N. stratiotata* (2), *Hydrocampa nymphеata* (1), *Notarcha ruralis* (1), *Phlyctaenia lutealis* (3), *Scopula* sp. (3), *Platyptilia gonodactyla* (1), *Peronea variegana* (1), *Agonopteryx costosa* (1), and *Hoffmannophila pseudospretella* (1).

The fact that a stretch of water may form an effective barrier to the dispersal of Lepidoptera because of the air temperature over its surface is of considerable importance. For example, it would indicate that the sea separating the British Isles from the Continent may form a far more effective barrier because of this than because of the distances involved. It will have been noted that the majority of the Lepidoptera taken in the trap were large and powerfully-flying species, while there were relatively few Geometers and even fewer Microlepidoptera. This would indicate that for the more feebly-flying species even a river is a formidable barrier to dispersal.

Ephemeroptera (J.R.H.). Five species of Mayflies were taken in the trap, mostly subimagines. It is probable that all but the *Ephemerella* spp. entered accidentally during daylight. No species was common, *Ephemerella ignita* and *E. notata* were frequent, *Baetis rhodani* and *B. pumilis* occasional and *Ephemera danica* rare.

Trichoptera (J.R.H.). Twelve species of Caddis flies occurred, some of them in vast numbers. Their numbers increased considerably when the trap was raised. As these insects usually fly over the surface of the water the same explanation which was applied to the Lepidoptera is unlikely to apply to them, and the reason for their increased numbers is not clear. With most species the females were much more numerous than the males; this may have been due primarily to the location of the trap, which faced over a section of the river where the males do not hover in any numbers, but where the females oviposit. *Tinodes waeneri* occurred in enormous numbers throughout the summer and *Hydropsyche ornatula* also was extremely abundant. *Sericostoma personatum* was not frequent although it is common along the river, and the same applies to *Mystacides azurea*. *Leptocerus cinereus* was frequent, *Silo pallipes*, *Rhyacophila munda*, *R. dorsalis* and *Limnophilus rhombicus* were occasional, and *Phryganea striata*, *Leptocerus albifrons* and *Agapetes fuscipes* were uncommon.

Plecoptera (J.R.H.). A single species of Stonefly was taken, *Isoperla grammatica*, which was frequent in May and June. Most specimens appeared to have entered the trap as nymphs, the adults apparently always hatching on the floor. In order to enter the trap the nymphs had to travel several feet. Several nymphs died without producing adults, presumably being killed by the heat inside the trap due to the electric bulb and the sun.

The Howth trap was of a different design, and consisted of a truncated glass pyramid with a 6-inch square opening at the top through which the insects could enter. Over the trap, and about two inches from the edges of the opening, was a flat roof, painted white below. The glass rested on a platform in the centre of which was a wooden container about a foot square. Illumination was provided by a 60-watt electric light bulb suspended within the glass pyramid. The trap was situated on the edge of the cliffs, partly projecting over the edge, on the eastern side of the promontory known as the Lion's Head. This is the well-known locality for the rare Howth Lepidoptera. The trap was in operation at irregular intervals, on an average of about two nights a week, from the middle of June to the beginning of September. It was not possible to visit it regularly and thus some method of killing the insects had to be used (they remained alive in the Lucan trap). Cyanide of potassium was tried at first, but the container was too large to permit the gas to reach an effective concentration. Later the insides of the trap were covered with " 666 " (benzene hexachloride) and this was more effective, but owing to its slow and irritant action many moths damaged themselves considerably before dying. No count of the captures was made.

The only insects identified were the Lepidoptera, and the following is a list of the 48 species which were sufficiently undamaged to be identifiable (B.P.B.): *Laothoë populi*, *Phalera bucephala*, *Arctia caja*, *Spilosoma lubricipeda*, *S. lutea*, *Callimorpha jacobaeae*, *Agrotis segetum*, *A. exclamationis*, *Lycophotia varia*, *Amathes xanthographa*, *Triphaena comes*, *T. pronuba*, *Ceramica pisi*, *Hadena andalusica* (*barrettii*), *H. lepida* (*capsophila*) (the commonest species in the trap), *Thalpophila matura*, *Luperina testacea*, *Apamea monoglypha*, *Aporophyla nigra*, *Procus strigilis*, *P. literosa*, *Leucania impura*, *L. lithargyria*, *L. conigera*, *Caradrina clavipalpis*, *Cosmia trapezina*, *Plusia chrysitis*, *P. gamma*, *Scopula marginepunctata*, *Ortholitha scotica*, *O. chenopodiata*, *Anaitis plagiata*, *Lyncometra ocellata*, *Xanthorhoë ferrugata*, *X. fluctuata*, *Epirrhoë alternata*, *E. galiata*, *Gymnoscelis pumilata*, *Ellopia fasciaria*, *Selenia bilunaria*, *Crocallis elinguaria*, *Gnophos obscurata*, *Pempelia dilutella*, *Crambus pascuellus*, *C. tristellus*, *Phlyctaenia lutealis*, *Polychrosis dubitana* (*littoralis*) and *Eupista* sp.

The relative scarcity of Microlepidoptera may have been due to the design of the trap, which prevented them from entering readily. Having experimented with traps of various designs and sizes during the past twelve years, I have come to the conclusion that the chief requisites for maximum efficiency are: ease of entry for the insects, and large size. If the insects can get in easily they also can get out easily, but if they have plenty of room to fly around the light a very large proportion of them will be retained.

[With reference to Dr Beirne's paper on light-trap captures at Lucan, Co. Dublin, he sent me some of the flies bred from " a mass of dead and decomposing insects (chiefly Diptera and Trichoptera) on the floor of the trap." These proved to be 1 ♂ of *Muscina assimilis*, Fall. and 2 ♂♂ and 2 ♀♀ of *M. pabulorum*, Fall., both common and widely distributed species. According to the text-books the larvae of this genus may be saprophagous, zoophagous, or omnivorous.—H. W. Andrews.]